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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/803,801	03/12/2001	Khalil Camille Haddad	1	8591

7590 01/10/2006

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EXAMINER	
PERILLA, JASON M	
ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/803,801	HADDAD, KHALIL CAMILLE	
	Examiner	Art Unit	
	Jason M. Perilla	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-16,18-26 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-16,18-26 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-8, 10-16, 18-26 and 28 are pending in the instant application.

Response to Amendment/Argument

2. Applicant's arguments, see pages 3-10, filed October 24, 2005, with respect to the prior art rejections including at least Kapoor (US 6396886) have been fully considered and are persuasive. The prior art rejections including Kapoor have been withdrawn.

3. In view of the appeal brief filed on October 24, 2005, PROSECUTION IS HEREBY REOPENED. New art rejections are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4-6, 10-12, 14-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haddad et al ("Design of Digital Linear-Phase FIR Crossover Systems of Loudspeakers by the Method of Vector Space Projections", Haddad, Khalil C. et al; hereafter "Haddad" – previously cited) in view of Younce et al (US 5521908; hereafter "Younce").

Regarding claim 1, Haddad discloses a method designing a finite impulse response (FIR) filter (title; pg. 3058, col. 2, lines 15-16), said method comprising the steps of: establishing at least one set of defining constraints that said filter must satisfy in a time domain (pg. 3060, col. 2, line 9-15; equ. 11); establishing at least one set of defining constraints that said filter must satisfy in a frequency domain (pg. 3060, col. 1, line 26 – col. 2, line 9; equ. 8, 9, and 10); and determining an intersecting set of said at least one set of defining constraints that said filter must satisfy in the time domain and said at least one set of defining constraints that said filter must satisfy in the frequency domain (pg. 3059, col. 2, lines 39-44; pg. 3060, fig. 2). Haddad teaches a method to solve a mathematical problem encompassing multiple constraints by vector space projection (page 3059, lines 10-16). Haddad further teaches that the desired result of using the vector space projection method (VSPM) is the "solution set" or the set that satisfies all the constraints (page 3059, lines 38-42; fig. 2) and that the VSPM method

has significant flexibility in that any number of constraints may be incorporated (page 3063, lines 8-11). Haddad explicitly discloses designing an FIR filter but not a shortening impulse response (SIRF) filter. However, one skilled in the art is aware of the similarities between FIR and SIRF filters. An SIRF filter is a particular type of FIR filter and both have a finite impulse response. Younce teaches the use of an SIRF filter in a data communications system (abstract) and teaches that it shortens the impulse response of the effective channel (col. 1, line 43). Younce further teaches that an SIRF filter is a type of FIR filter (col. 1, line 40). Because the VSPM method of Haddad allows for significant flexibility in that any number of constraints may be incorporated into the design, one skilled in the art would find it advantageous to use the method to design not only FIR filters but similar filters such as SIRF filters as suggested by Younce depending upon the type and response of filter required. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the VSPM method of Haddad to design an advantageous shortening impulse response SIRF filter as suggested by Younce because designing an SIRF filter using VSPM methods would allow for flexible design using multiple constraints. Furthermore, Haddad discloses that the VSPM method is used to design digital filters but does not explicitly disclose that it is used to determine the coefficient values for digital filters. However, one skilled in the art is notoriously aware that the design of a digital filter is comprised of finding the coefficient values of the filter taps as disclosed by Younce (abstract).

Regarding claim 2, Haddad in view of Younce disclose the limitations of claim 2 as applied above. Further, Haddad discloses that said at least one set of defining constraints that said filter must satisfy in the time domain define a filter having a linear phase response (pg. 3060, eq. 4, col. 2, lines 26-28).

Regarding claim 4, Haddad in view of Younce disclose the limitations of claim 1 as applied above. Further, Haddad discloses that the time domain constraints specify a length of the impulse response *L* (pg. 3060, eq. 4, col. 2, lines 26-28) and Younce suggests that an SIRF filter shortens a channel impulse response (col. 2, lines 40-45). Therefore, in the method of Haddad in view of Younce, VSPM would be utilized to shorten the impulse response of the SIRF filter via the time domain constraints.

Regarding claim 5, Haddad in view of Younce disclose the limitations of claim 1 as applied above. Further, Haddad discloses that the frequency domain constraints include a frequency response for the SIRF filter that does not attenuate a received signal (fig. 3). Figure 3 of Haddad illustrates frequency domain attenuation regions for various filters which do not attenuate a received signal because they have a flat magnitude response.

Regarding claim 6, Haddad in view of Younce disclose the limitations of claim 1 as applied above. Further, Haddad discloses that the frequency domain constraints include a pass-band for said SIRF filter (fig. 3.). Figure 3 of Haddad illustrates frequency domain attenuation regions for various filters which include pass-band regions because they have a flat magnitude response or pass-band over a range of frequencies.

Regarding claim 10, Haddad in view of Younce disclose the limitations of claim 1 as applied above. Further, Haddad discloses that the VSPM method is iteratively applied between the time and frequency domain constraints until the sets converge (fig. 2).

Regarding claim 11, Haddad in view of Younce disclose the limitations of the claim as applied to claim 1 above.

Regarding claim 12, Haddad in view of Younce disclose the limitations of claim 11 as applied above. Further, Haddad in view of Younce disclose the remaining limitations of the claim as applied to claim 2 above.

Regarding claim 14, Haddad in view of Younce disclose the limitations of claim 11 as applied above. Further, Haddad in view of Younce disclose the remaining limitations of the claim as applied to claim 4 above.

Regarding claim 15, Haddad in view of Younce disclose the limitations of claim 11 as applied above. Further, Haddad in view of Younce disclose the remaining limitations of the claim as applied to claim 5 above.

Regarding claim 16, Haddad in view of Younce disclose the limitations of claim 11 as applied above. Further, Haddad in view of Younce disclose the remaining limitations of the claim as applied to claim 6 above.

Regarding claim 18, Haddad in view of Younce disclose the limitations of claim 11 as applied above. Further, Haddad in view of Younce disclose the remaining limitations of the claim as applied to claim 10 above.

6. Claims 19, 20, 22-24, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haddad in view of Younce, and in further view of Gandhi et al (US 6112218; hereafter "Ghandi" – previously cited).

Regarding claim 19, Haddad in view of Younce disclose a method for determining coefficient values for a shortening impulse response filter (SIRF) as applied to claim 1 above. Although digital signal processors (DSP) executing instructions stored on memory communicatively coupled to them are notoriously known for implementing inventions which process digital information, Haddad in view of Younce does not disclose the use of one. However, Ghandi does teach the use of a DSP and a memory for implementing a filter (abstract; col. 18, lines 28-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize a memory and a DSP as taught by Ghandi in the method of Haddad in view of Younce because it provides an exceptionally flexible means to implement the filter.

Regarding claim 20, Haddad in view of Younce, and in further view of Gandhi disclose the limitations of claim 19 as applied above. Further, Haddad discloses that said at least one set of defining constraints that said filter must satisfy in the time domain define a filter having a linear phase response (pg. 3060, eq. 4, col. 2, lines 26-28).

Regarding claim 22, Haddad in view of Younce, and in further view of Gandhi disclose the limitations of claim 19 as applied above. Further, Haddad discloses that the time domain constraints specify a shortening of a channel impulse response (pg. 3060, eq. 4, col. 2, lines 26-28).

Regarding claim 23, Haddad in view of Younce, and in further view of Gandhi disclose the limitations of claim 19 as applied above. Further, Haddad discloses that the frequency domain constraints include a frequency response for the SIRF filter that does not attenuate a received signal (fig. 3). Figure 3 of Haddad illustrates frequency domain attenuation regions for various filters which do not attenuate a received signal because they have a flat magnitude response.

Regarding claim 24, Haddad in view of Younce, and in further view of Gandhi disclose the limitations of claim 19 as applied above. Further, Haddad discloses that the frequency domain constraints include a pass-band for said SIRF filter (fig. 3.). Figure 3 of Haddad illustrates frequency domain attenuation regions for various filters which include pass-band regions because they have a flat magnitude response or pass-band over a range of frequencies.

Regarding claim 28, Haddad in view of Younce, and in further view of Gandhi disclose the limitations of claim 19 as applied above. Further, Haddad discloses that the VSPM method is iteratively applied between the time and frequency domain constraints until the sets converge (fig. 2).

7. Claims 3, 7, 8, 13, 21, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haddad in view of Younce, and in further view of Haddad, Khalil C. ("Constrained FIR Filter Design by the Method of Vector Space Projections", Haddad, Khalil C. et al; hereafter "Khalil" – previously cited).

Regarding claim 3, Haddad in view of Younce disclose the limitations of claim 1 as applied above. Haddad in view of Younce do not disclose that said at least one set

of defining constraints that said filter must satisfy in the frequency domain define a filter having a non-linear phase response. However, Khalil teaches a VSPM method wherein a filter is designed having an arbitrary magnitude and phase response (page 719, col. 1, lines 20-40; col. 2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to create a filter with an arbitrary magnitude and phase response as suggested by Khalil depending upon the desired filter response. Applicant has not disclosed that the particular set of constraints provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with several different types of magnitude and phase response because the VSPM method is very flexible. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to design a filter having an arbitrary magnitude and phase response as suggested by Khalil in the method of Haddad in view of Younce because it represents an arbitrary design which is flexible.

Regarding claim 7, Haddad in view of Younce disclose the limitations of claim 2 as applied above. Haddad in view of Younce do not disclose the particular set of defining constraints as further limited in the claim. However, Khalil teaches a VSPM method wherein a filter is designed according to the set of constraints (page 716, col. 1, lines 20-40; col. 2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to utilize the particular set of defining constraints as suggested by Khalil depending upon the desired filter response. Applicant has not disclosed that the particular set of constraints provides an advantage, is used for a

particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with several different types of constraint sets because the VSPM method is very flexible. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the set of constraints as suggested by Khalil in the method of Haddad in view of Younce because it represents an arbitrary design which is flexible.Regarding claim 8, Haddad in view of Younce disclose the limitations of claim 3 as applied above. Haddad in view of Younce do not disclose the particular set of defining constraints as further limited in claim the claim. However, Khalil teaches a VSPM method wherein a filter is designed according to the set of constraints (page 716, col. 1, lines 20-40; col. 2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to utilize the particular set of defining constraints as suggested by Khalil depending upon the desired filter response. Applicant has not disclosed that the particular set of constraints provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with several different types of constraint sets because the VSPM method is very flexible. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the set of constraints as suggested by Khalil in the method of Haddad in view of Younce because it represents an arbitrary design which is flexible.

Regarding claims 13 and 21, the respective limitations of claims 11 and 19 are disclosed by Haddad in view of Younce as applied above. Further, the additional limitations of claims 13 and 21 are disclosed by Khalil as applied to claim 3 above.

Regarding claims 25 and 26, the respective limitations of claims 20 and 21 are disclosed by Haddad in view of Younce as applied above. Further, the additional limitations of claims 25 and 26 are disclosed by Khalil as applied respectively to claims 7 and 8 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
December 22, 2005

jmp

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER